Important Advances in Clinical Medicine

Epitomes of Progress—General Surgery

The Scientific Board of the California Medical Association presents the following inventory of items of progress in General Surgery. Each item, in the judgment of a panel of knowledgeable physicians, has recently become reasonably firmly established, both as to scientific fact and important clinical significance. The items are presented in simple epitome and an authoritative reference, both to the item itself and to the subject as a whole, is generally given for those who may be unfamiliar with a particular item. The purpose is to assist the busy practitioner, student, research worker or scholar to stay abreast of these items of progress in General Surgery which have recently achieved a substantial degree of authoritative acceptance, whether in his own field of special interest or another.

The items of progress listed below were selected by the Advisory Panel to the Section on General Surgery of the California Medical Association and the summaries were prepared under its direction.

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Acute Arterial Thrombosis

ACUTE ARTERIAL THROMBOSIS is relatively uncommon in the spectrum of arterial occlusive disorders. However, because of its catastrophic nature and special therapeutic requirements it must be quickly differentiated from the more common embolus, which it can closely mimic. The rapidity of the process precludes the collateral compensation seen in chronic occlusions and tissue loss is eminent.

There is an extensive list of disease states associated with acute arterial thrombosis but the pathogenesis, originally described by Virchow, is relatively constant and involves no more than three factors. The most easily appreciated is a change in the arterial wall. This is usually the result of one of the degenerative diseases, most commonly atherosclerosis, but may also be secondary to inflammation (arteritis) or trauma of even a minor nature. In some young patients hypoplastic vessels have been found. The second factor sometimes seen is an alteration in the blood composition producing a hypercoagulable state. This might occur with the myeloproliferative disorders or after trauma. Finally, a sudden decrease in the rate of blood flow is commonly found just before thrombosis. This may be the result of a decrease in cardiac output, hypovolemia or a generalized loss of vascular tone.

The diagnosis can be established clinically, though arteriography is helpful in the general vascular evaluation. There are always rest pain, signs of ischemia and a lack of pulses in the involved area. There will usually be no apparant (cardiac) source for an embolus. This is the clinical clue that these signs and symptoms are manifestations of acute thrombosis and not embolus. The lower

half of the body is most commonly affected because of the common association of atherosclerosis and a propensity for decreased flow states. In decreasing order the femoral, popliteal, iliac arteries and aorta will be involved. Acute arterial thrombosis in the arms or neck (excluding a cerebrovascular accident) is unusual and often associated with trauma.

The exclusion of an embolus is therapeutically important because standard methods of embolectomy, though relatively safe and uncomplicated, are usually futile when acute thrombosis is present. An unsuccessful embolectomy in such a patient should alert the surgeon to possible acute thrombosis. When further attempted in these patients it may unnecessarily jeopardize limb and life. The best results have been achieved with emergent arterial reconstruction, preferably with a bypass procedure or, if the thrombosis is localized, endarterectomy. With this aggressive approach, limb salvage can be achieved in over 90 percent of cases and the rate of survival increased over that achieved with lesser procedures.

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Aortoiliac Steal Syndrome

KOUNTZ, LAUB AND CONNOLLY described a new syndrome in 1966 in which blood is shunted away from the mesenteric arterial bed into disobliterated or bypassed peripheral arteries. This stealing of blood from the mesenteric circulation can result in gangrene of the bowel after a reconstructive operation on the aortoiliofemoral vessels. This syndrome was called the aortoiliac steal syndrome.

Animal experiments by the original authors showed that lumbar sympathectomy or iliac bypass grafting steals blood from the superior mesenteric artery in an inverse relationship to the amount of new blood diverted peripherally by the procedure.

Such stealing is normally tolerated by the mesenteric circulation unless it is severely compromised. Preoperative compromise of the mesenteric circulation is identified by the presence of an enlarged central anastomotic artery on aortography. An enlarged central anastomotic artery always means pronounced stenosis or obstruction of two of the three mesenteric takeoff vessels.

A number of clinical reports of gangrene of the bowel secondary to the aortoiliac steal syndrome have appeared since 1966 and underscore the need for understanding this syndrome by those performing peripheral vascular surgical procedures.

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Resection of Aortic Arch Aneurysms

UNTIL RECENTLY, resection of aortic arch aneurysms with prosthetic graft replacement was a hazardous undertaking, owing largely to the complicated perfusion apparatus that has been used for circulatory support during operation. To provide complete perfusion of vital organs, inflow catheters must be placed in the innominate artery, the left carotid artery, the left brachial artery and a femoral artery. The problems of adjusting pressures and flow rates in these multiple infusion lines have generally resulted in uneven perfusion of various portions of the circulation with resulting ischemic damage.

Recently the success of the technique of total body hypothermia and circulatory arrest in dealing with complex congenital heart lesions in infants has suggested that with modification the technique might be applicable to the adult. In adult dogs if the brain temperature is less than 20°C, periods of circulatory arrest up to one hour are well tolerated. Based on these findings a technique has been developed which allows replacement of the aortic arch with the same operative risk as replacement of any other portion of the intrathoracic aorta.

Our present technique for aortic arch replacement is as follows. Following induction of anesthesia, surface cooling lowers the patient's temperature to 30°C. A median sternotomy with an